

REMARKS

Claims 31, 33-39, and 41-50 are pending in the application. Claims 31 and 33-39 and 41-50 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Xu et al. (U.S. 6,356,014) in view of Lee (U.S. 5,401,676). Applicant traverses the rejection and submits that the claims are in immediate condition for allowance. Reconsideration is respectfully requested.

The Applicant submits that the rejection under 35 U.S.C. §103(a) is improper because the Examiner has not provided a prima facie suggestion or motivation to combine the Xu and Lee references (MPEP 2143.01). Regarding independent claims 31, 39 and 50, Xu does not teach the use of metal silicides (p-doped amorphous silicon, microcrystalline silicon, monocrystalline silicon, iridium silicide, nickel silicide, platinum silicide and palladium silicide) for forming an emitting layer that has a thickness between 50 and 3000 angstroms. As mentioned in the response of June 2, 2003 metal silicides have a relatively high work function (see page 5 of response). In contrast, Xu specifically teaches that the emitting layer used in the cathode tip has a lower work function (col. 2, lines 65-67; col. 5, lines 50-56). Furthermore, Xu specifically uses a carbon containing material (col. 6, lines 17-18, 31-32; 57-67) as an emitting layer to improve the chemical robustness of the emitter tip (col. 6, lines 9-15).

Lee discloses a metal silicide layer (40) at the boundry of the tip metal (47) and the silicon emitter (37) . . . formed in accordance with the kind of the gate metal, namely, one of CrSi_2 , MoSi_2 , TaSi_2 , Wsi_2 , and ZrSi_2 ” (col. 4, lines 19-24). In contract to the present invention, the metal silicide emitter layer in *Lee* is formed expressly for reinforcing the tip and to block permeation of the metal component to the insulating layers (col. 2, lines 5-8; col. 4, lines 24-38). Thus, *Lee* does not teach or suggest that the thickness levels recited in claims 31 and 39, since the disclosure in *Lee* uses the metal silicide layer as a partial insulating region for the emitting tip.

While the Examiner cited that “it would have been obvious to a person of ordinary skill in the art . . . to use the material metal silicides for the emitting layer of Xu et al. for purposes of providing a stronger electron emission characteristic of the emitter”, this assertion runs totally contrary to the teachings in Xu and Lee. As stated previously, the carbon containing material used in the emitting layer of Xu is formed over the emitter tip to reduce chemical reaction between the emitter tip and other elements, such as oxygen and water (col. 6, lines 10-13). There is no teaching or suggestion in Xu that would be sufficient for one of ordinary skill in the art to make the proposed substitution, combination or modification disclosed in Lee (see *In re Linter*, 458, F.2d 1013, 1016 (C.C.P.A. 1972); MPEP 2143.01). “The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant’s disclosure.” *In re Vaeck*, 947 F.2d 488 (Fed. Cir. 1991); MPEP 2143.

Moreover, if a proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Rati*, 270 F.2d 810 (C.C.P.A. 1959); MPEP 2143.01. *Lee* teaches that the metal silicide is formed *only on a portion the tip* of the cone shaped emitter (col. 3, lines 10-13), and expressly disparages the prior art for using a metal silicide emitting layer over the entire tip using the disclosed structure and thickness (col. 2, lines 15-26). Since *Lee* teaches the metal silicide layer as being useful only on a portion of the tip in an insulating capacity, the disclosure in *Lee* would could not be properly combined with *Xu* under 35 U.S.C. §103, since *Xu* teaches the use of an emitter layer over the entire tip for an entirely different purpose.

Accordingly, Applicant submits that the §103 rejection is improper, and respectfully requests that the rejections for claims 31, 39, and 50, and all claims depending therefrom, be withdrawn.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

Dated: September 29, 2003

Respectfully submitted,

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